U. S. DEPARTMENT OF ENERGY
WORK BREAKDOWN STRUCTURE DICTIONARY
PART II - ELEMENT DEFINITION

1. PROJECT TITLE/PARTICIPANT	2. DATE	3. IDENTIFICATION SITE
Environmental Management/Paducah Remediation Services, LLC (PRS)	06/29/07	Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)

4. WBS ELEMENT CODE	5. WBS ELEMENT TITLE
04.11.10.08	Outyear Groundwater Fenceline Action

6. INDEX LINE NO.	7. REVISION NO. AND AUTHORIZATION	8. DATE
N/A	Rev. 0	06/29/07

9. APPROVED CHANGES
N/A

10. SYSTEM DESIGN DESCRIPTION	11. BUDGET AND REPORTING NUMBER
N/A	N/A

12. ELEMENT TASK DESCRIPTION

THIS IS A PLANNING LEVEL WBS DICTIONARY

WBS STRUCTURE

- WBS 04.11.10.08.01 Groundwater Fenceline Action Subproject Management
- WBS 04.11.10.08.02 Proposed Plan
- WBS 04.11.10.08.03 Record of Decision/LUCIP
- WBS 04.11.10.08.04 Remedial Design Work Plan
- WBS 04.11.10.08.06 Remedial Design Report
- WBS 04.11.10.08.07 Remedial Action Work Plan
- WBS 04.11.10.08.08 Remedial Action
- WBS 04.11.10.08.09 Remedial Action Completion Report

INTRODUCTION

In 1988, widespread contamination of groundwater by trichloroethene (TCE) and technetium-99 (Tc-99) around the Paducah Gaseous Diffusion Plant (PGDP) was detected. In 1993, an Engineering Evaluation/Cost Analysis was approved, and it established the Water Policy to protect the public from use of impacted groundwater by supplying public water. In 1995 and 1997, interim measures were taken to contain the high concentration areas of the Northwest and Northeast Plumes. The interim measures included installation of two groundwater pump and treatment systems, one each at the Northwest and Northeast Plumes. Additionally, remedial investigations (RIs) were performed to determine the extent of groundwater contamination at PGDP. Results of these investigations detected the presence of dense non-aqueous phase liquid (DNAPL) on-site and up to three dissolved-phase plumes (northeast, northwest, and southwest) outside the facility fenceline. As a result of the RIs and baseline risk assessment performed for the Groundwater Operable Unit (GWOU), the following groundwater problem statements have been developed.

- TCE exists as DNAPL in three main areas C-400 Building, C-720 Building, and C-474-C Oil Landfarm. This organic compound is found in both the Upper Continental Recharge System (UCRS) and the Regional Gravel Aquifer (RGA) at the C-400 Building and in the UCRS at the C-720 Building and C-474-C Oil Landfarm. The mass of TCE in these areas must be reduced, removed, or contained before it is possible to return the groundwater to beneficial use.
- TCE and its degradation products exist at lower concentrations throughout the plumes both on and off U.S. Department of Energy (DOE) property. These dissolved concentrations need to be reduced before the groundwater at or around the PGDP can be returned to beneficial use.
- Dissolved-phase TCE and Tc-99 are discharging to surface water in Little Bayou Creek in the off-site area. These releases may to be contained or eliminated to remove direct contact risks to human

health and the environment.

To address these problems, DOE has developed a remedial strategy for PGDP to stop plume growth and migration of contaminants and to reduce the toxicity and volume of contaminants. The strategy includes employing various technologies as an early action, source area actions, fenceline actions, off-site plume actions, and institutional control action.

LOGIC RELATIONSHIPS

Interfaces:

Internal to Contractor

- All contractor project managers and staff
- All subcontractors

External to Contractor

- DOE Portsmouth/Paducah Project Office and support contractors
- DOE Headquarters or other DOE Sites (if applicable)
- U.S. Environmental Protection Agency (EPA)
- Commonwealth of Kentucky (KY)
- Site tenants including United States Enrichment Corporation (USEC); Uranium Disposition Services, LLC; and Swift and Staley Team (SST)
- USEC services in the area of property, information technology, radios, etc.
- SST, particularly in the areas of property management, information technology, and security
- Nevada Test Site (NTS): Profiling and disposition of newly generated and classified and fissile low-level waste (LLW), if required or applicable
- Energy*Solutions*: Profiling, treatment, and disposition of mixed and LLW, if required or applicable.
- Toxic Substances Control Act (TSCA) Incinerator, if required or applicable
- Commercial treatment, storage, or disposal facility: For treatment and disposal of nonradioactive hazardous waste, if required or applicable
- Stakeholders
- Citizens Advisory Board and supporting contractor EHI
- DOE Integrated Safety Management System (ISMS) Verification Team
- Other nonregulatory key interfaces

Time Sequencing with Other Work:

- Decision documents such as Proposed Plans (PPs) and Records of Decision (RODs) are completed as part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process before proceeding with the design and action implementation subproject tasks.
- Designs and other decision documents must be complete before proceeding with the construction and operation of the selected remedy for remedial action.

SCOPE DESCRIPTION

The objective of this subproject is to document and perform a CERCLA remedial action for the GWOU and is part of the overall strategy for ultimate remediation to levels that are protective of human health and the environment. The GWOU consists of the groundwater plumes on and off-site and any source areas associated with the plumes. The fenceline action provides containment of the source areas and on-site dissolved-phase plumes at the security fenceline for the PGDP. This action combined with other on-site source area and off-site dissolved-phased plume actions are part of the overall remedial strategy for the GWOU. The remedial action assumed to be implemented for the element is the

construction of permeable treatment zones near the fence areas of the PGDP plant to capture any migrating contaminants.

WBS 04.11.10.08.01 Groundwater Fenceline Action Subproject Management

Provide overall management activities associated with this subproject. Activities performed under this subelement include the following:

- Perform technical, contractual, and project functions necessary to effectively manage and report scope, schedule, and budget.
- Manage and transmit required documents to the Administrative Record.
- Maintain all activities within the defined safety, environmental, and quality requirements.
- Perform technical and personnel management functions.
- Maintain technically qualified and properly trained personnel.
- Develop, evaluate, and report project performance metrics.
- Interface with DOE, KY, EPA, other prime contractors, and stakeholders, as needed.

The method(s) used for determining earned value for this WBS element is Level of Effort.

WBS 04.11.10.08.02 Proposed Plan

The PP document will be developed consistent with the data collected from the supporting documents for the GW Fenceline action including the Monitored Natural Attenuation Report, Site Investigations and other environmental actions, etc. The PP will be developed utilizing the requirments of the PGDP FFA and CERCLA. The PP is expected to undergo a 45-day public comment period as required in the FFA.

The Proposed Plan will include the following components:

- Complete D0, D1, and D2 Proposed Plan for Fenceline Action

The method(s) used for determining earned value for this WBS element is Percent Complete.

WBS 04.11.10.08.03 Record of Decision/LUCIP

Following completion of the public review of the PP, the ROD will be developed that identifies the selected remedial action. Comments received from the public review of the proposed plan will resolved and incorporated into the ROD. The ROD will include a summary level of the remedial alternatives considered during the selection process.

Included and developed in parallel with the ROD, the Land Use Control Implementation Plan (LUCIP) will be developed, reviewed and approved. The LUCIP, once completed and approved, along with the ROD will be appended to the Land Use Control Plan for the PGDP site. The LUCIP will document the detail and placement of the institutional control measures that were documented, as necessary, in the approved ROD.

The ROD will include the following components:

- Complete D0, D1, D2 for ROD/ LUCIP

The method(s) used for determining earned value for this WBS element is Percent Complete.

WBS 04.11.10.08.05 Remedial Design Work Plan

The remedial design work plan (RDWP) will select the approach and schedule for designing the remedial action selected for the GW Fenceline Action. It will include discussions of the design phases the applicable design criteria and requirements, including the applicable ARARs for the project. The

RDWP also will include the schedule for the completing the design and beginning field implementation within the 15 month CERCLA statutory requirement.

The RDWP is expected to include the development of the following versions of the document.

- Complete D0, D1, D2 for RDWP

The method(s) used for determining earned value for this WBS element is Percent Complete.

WBS 04.11.10.08.06 Remedial Design Report

- The remedial design report (RDR) will include the development and publication of the 30%, 60%, 90% and CFC remedial designs for the remedial action. The designs will include both drawings and construction specifications necessary to implementing the action. Included within this element is the procurement of the necessary construction contractors to implement the selected remedial measure. The remedial measure is assumed to be an approximately total of 16,000 linear ft of PTZ. 14,000 linear ft along west, north, and east side of PGDP, and 2,000 linear ft between the fenceline and Little Bayou Creek.

The major components included in this element are as follows:

- Complete Procurement of Remedial Design-Build Subcontract
- Complete D0, D1, and D2 RDR
- Issue Certified for Construction Design and Drawings
- Certified for Construction approval

The method(s) used for determining earned value for this WBS element is Percent Complete.

WBS 04.11.10.08.07 Remedial Action Work Plan

The Remedial Action Work Plan (RAWP) element will plan and document the field approach to implementing the selected remedial measure. This will include laying the phases of construction and their sequencing of the work to allow the action to be performed. The sequencing will be documented in a project schedule identifying at a minimum the mobilization, construction, shake-down and testing, operations and demobilization phases of activities.

The major components of this element include:

- Complete D0, D1, D2 RAWP
- Complete D0, D1, and D2 Construction Quality Assurance (QA) Plan

The method(s) used for determining earned value for this WBS element is Percent Complete.

WBS 04.11.10.08.08 Remedial Action

This element will include the actual construction and operation of the remedial measure selected for the GW Fenceline Action. Efforts will include the procurement phase, construction, shake-down, operations and demobilization phases. A verification phase to the remedial action will not be necessary to determine if the remedial measure is complete, since the remedial measure is a long- term remediation utilizing permeable treatment zone technology.

The major components of this element include:

- Complete Remedial Action Construction
- Complete D0, D1, and D2 Operations and Maintenance (O&M) Plan

The method(s) used for determining earned value for this WBS element is Unit Completion.

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Before beginning fieldwork, the project team must have an internal field review (IFR). For this IFR, the project team will put together a work package. This work package includes the following:

- Work instructions – includes hold points
- Training matrix and evidence of training
- UCD/USQD
- Lessons Learned
- Work authorization and work release from facility managers
- Procedures
- AHA
- Excavation/Penetration Permits
- RWP
- Team Meeting documentation
- Project Organizational Chart

In addition to the above, a Sampling Analysis Plan (SAP), Quality Assurance Plan (QAP), Waste Management Plan (WMP), and Health and Safety Plan (H&S) may be needed for any non-CERCLA actions.

For CERCLA actions, the appropriate FFA/CERCLA documentation will be required which will include SAP, QAP, WMP, H&S Plan, and other documents, as applicable to the action. These documents may require regulatory approval.

The work package and other documentation are developed by personnel that charge to this project and also by personnel that charge to project support service center (i.e., QAP and RWP).

WBS 04.11.10.08.09 Remedial Action Completion Report

The remedial action completion report documents the completion of construction and the start of operation of the selected measure. It further identifies to the degree possible the timeframe of operations that is expected to meet the necessary cleanup objectives or the continued routine maintenance as required for treatment zone technology.

The versions of the report expected for development include the following:
Complete D0, D1, D2 Remedial Action Completion Report

The method(s) used for determining earned value for this WBS element is Percent Complete.

DELIVERABLES

WBS 04.11.10.08.01 Groundwater Fenceline Action Subproject Management

Element Milestones:

- None

Element Deliverables:

- Paducah contractor QA Project Plan
- Paducah contractor environmental, safety, and health (ES&H) Plan
- Provide input to the following reports and submittals (if applicable):
  - Monthly Project Performance Report
  - Risk Management Plan Updates
  - Site Management Plan (SMP)
  - Semiannual Critical Analysis Report

- Presentations
- FFA briefings
- Labor Standards Determinations
- Gold Chart Performance Metrics
- Annual updates to Site Treatment Plan
- Annual Compliance Agreement Report
- Annual ISMS Update
- Annual Work Smart Standards Update
- Financial Reporting, Management Analysis Reporting System
- Annual Statement of Costs Incurred and Claimed
- FFA Semiannual Progress Report
- Remedial Action/Regulatory Commitment Tracking Report
- Other reports/documents, as necessary

WBS 04.11.10.08.02 Proposed Plan

Element Milestones:

- Approval of the D2 PP

Element Deliverables:

- Proposed Plan D0, D1, and D2 versions

WBS 04.11.10.08.03 Record of Decision

Element Milestones:

- Approval of the D2 ROD/LUCIP

Element Deliverables:

- ROD/LUCIP D0, D1, and D2 versions

WBS 04.11.10.08.05 Remedial Design Work Plan

Element Milestones:

- Approval of the D2 RDWP

Element Deliverables:

- RDWP D0, D1, and D2 versions

WBS 04.11.10.08.06 Remedial Design Report

Element Milestones:

- Approval of the D2 RDR

Element Deliverables:

- RDR D0, D1, and D2 versions

WBS 04.11.10.08.07 Remedial Action Work Plan

Element Milestones:

- Approval of the D2 RAWP

Element Deliverables:

- RDWP D0, D1, and D2 versions

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WBS 04.11.10.08.08 Remedial Action

Element Milestones:

- GW Fenceline Remedial Action start fieldwork

Element Deliverables:

- Complete waste disposal

WBS 04.11.10.08.09 Remedial Action Completion Report

Element Milestones:

- Approval of D2 Remedial Action Completion Report

Element Deliverables:

- Remedial Action Completion Report D0, D1, and D2 versions

REQUIREMENTS

- CERCLA/National Contingency Plan
- KY Hazardous Waste Permit (KY8-890-008-982)
- FFA for the PGDP
- SMP for the PGDP (annual revisions)
- Applicable state and federal laws and regulations (applicable or relevant and appropriate requirements)
- Contractor ISMS
- UEO-1066, as updated, Lease Agreement between DOE and USEC, Revision 4, dated October 30, 2001
- Enclosure to GDP 95-0018, as updated, USEC and DOE Resolution of Shared Site Issues, Revision 1, dated March 30, 1998
- Applicable contractor plans, policies, and procedures
- Waste acceptance criteria (WAC) for all applicable treatment and disposal facilities that were in effect on April 24, 2006.
- Applicable DOE Orders
- Applicable Federal Acquisition Regulations

It is the core value of the Contractor that the safety and health of every worker, the public at large, and our environment are the most important assets that we are entrusted to protect. To accomplish this, an ISMS, based on DOE's ISMS, has been implemented that incorporates the five core functions and is based on the seven guiding principles. The objective of ISMS is to systematically integrate safety and environmental protection into the planning and execution of all work activities. The term safety encompasses Nuclear Safety, Industrial Safety, Industrial Hygiene, Occupational Health, Health Physics, and environmental issues. ISMS requirements flow down to contractor subcontractors. The five core functions are (1) define the scope of work, (2) analyze hazards, (3) develop and implement hazard controls, (4) perform work within controls, and (5) provide feedback and continuous improvement. The seven guiding principles are (1) line management responsibility for safety, (2) clear roles and responsibilities, (3) competence commensurate with responsibility, (4) balanced priorities, (5) identification of safety standards and requirements, (6) hazard control tailored to work being performed, and (7) operations authorization.

Before a subproject begins, several activities must be completed that demonstrate that all involved in the project have completed rigorous health and safety reviews and that all potential hazards of doing the work have been identified. The routine activities in remedial actions are conducted in accordance

with standard operating procedures, activity hazard analyses, and Integrated Safety Management plans. Nonroutine work will require a readiness assessment, as necessary, to ensure complete health, safety, and environmental reviews prior to work start. This assessment is conducted by people experienced in similar kinds of work with the right to examine all aspects of a project about to commence and requires that the project team provide documented evidence that any applicable requirements of the job have been met.

SCOPE ASSUMPTIONS

- The scope of work within this subproject includes activities previously included in the baseline and agreed to with the regulators in the past that may not result in cost effective risk reduction. DOE is working to revise this subproject work consistent with the risk-based end state initiative. This baseline is a planning document, not a decision document. These actions are included at this time because the project has a reasonable expectation that this work will be required as a result of the CERCLA/FFA decision process. In the alternative, if a decision is made to reduce scope, a change to the baseline will be processed accordingly. In those cases where the project believes there is a reasonable expectation that no further action is required, the scope has been removed from the baseline. In the event the decision process requires work to be performed, a modification to the baseline will be processed accordingly.
- Remedial Action will include 14,000 liner ft of sitewide permeable treatment zone installed around the west, north, and east sides of PGDP to control contamination in the RGA, and 2,000 linear ft between the fenceline and Little Bayou Creek.
- The primary driver is the RCRA/CERCLA process outlined by the FFA and SMP for PGDP.
- DOE funding will be available to perform the defined scope of work.
- EPA and KY will adhere to review times set forth in the FFA.
- All D2 documents will be approved as submitted; therefore, development of a D3 document will not be required. Major changes will not be required to any document as a result of reviewer comments. Major changes include, but are not limited to, complete section or chapter rewrites, the addition of new sections or chapters, complete figure, table or map modifications, the addition of new figures, tables, or maps, changes to scientific modeling input parameters, and the use of scientific models other than those agreed in the Work Plans or Feasibility Studies.
- No more than two audits per year will occur during the duration of the scope outlined within this baseline.
- Unexpected contaminants will not be encountered. Contaminants of concern include TCE and its degradation products *cis* 1, 2-dicholorethene, vinyl chloride, and Tc-99.
- All remedial actions will meet the requirements of CERCLA and the Secretarial Policy for addressing National Environmental Policy Act (NEPA) values as provided in the GWOU ROD.
- Long-term monitoring scope of the remedial action is expected to continue for an indefinite period of time and will be captured by the Long-Term Surveillance and Maintenance (S&M) and Stewardship Monitoring Lifecycle Baselines.
- Reactive wall media will not require excavation.
- The expected average vertical thickness of the RGA in the vicinity of the groundwater plumes is approximately 70 ft.

COMPLETION CRITERIA

WBS 04.11.10.08.01 Groundwater Fenceline Action Subproject Management

- Completion of all technical and reporting requirements for the conduct and reporting of the Remedial Action.

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WBS 04.11.10.08.02 Proposed Plan
- EPA/KY approval of the PP

WBS 04.11.10.08.03 Record of Decision
- EPA/KY approval of the ROD/LUCIP

WBS 04.11.10.08.05 Remedial Design Work Plan
- EPA/KY approval of the RDWP

WBS 04.11.10.08.06 Remedial Design Report
- EPA/KY approval of the RDR

WBS 04.11.10.08.07 Remedial Action Work Plan
- EPA/KY approval of the RAWP

WBS 04.11.10.08.08 Remedial Action
- PTZ will be constructed and ready for O&M.
- Waste will be disposed of within one year of generation.

WBS 04.11.10.08.09 Remedial Action Completion Report
- EPA/KY approval of the Remedial Action Completion Report

RISK MANAGEMENT

See Risk Management Plan for analysis

Risk was mitigated through the following efforts:
- Continue to perform due diligence in all work activities to reduce the possibility of safety incidents.
- Perform due diligence to ensure that waste is properly packaged and that transportation conveyances are properly loaded.
- Follow waste characterization, packaging, transportation, and disposition procedures and plans.
- Ensure that documents are written professionally and accurately.
- Ensure that fieldwork is carried out safely and in accordance with work instructions.
- DQOs will have qualitative and quantitative statements derived from the DQO Process that clarify study objectives, define the appropriate type of data, and specify the tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions and process knowledge.
- Subcontractor will follow ALARA principles and approved decontamination procedures.
- Ensure engineering design planning and review processes meet or exceed a design's intent for implementation.

CERCLA AREAS AND SWMU

None

BASIS OF ESTIMATE

1. Summary of Site Conditions

All remedial actions of the anticipated sources will be complete.

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2. Estimating Methods

☐ Parametric ☐ Bottom-Up ☒ Other: Parametric & Bottom-Up

3. Sources of Estimating

Labor – Technical review of documents to be prepared determined the mix of labor required for document preparation. Echols & R.S. Means were used to determine craft types to be used for construction-type activities. Project team meetings were utilized to identify staff types to be used for other areas, such as sample collection and analysis, waste characterization and disposal, health and safety monitoring, etc.

Equipment – Echols & R.S. Means were two printed sources used to determine the types of equipment needed to conduct the work proposed. Experience from technical staff also provided input as to the type of equipment needed.

Materials – Same as equipment.

Other Direct Cost – Same as equipment.

Transportation – Same as equipment.

Subcontracts – Experience from technical staff provided requirements for the involvement of subcontracts.

4. Basis of Estimate (Unescalated Values)

See Detail Estimate.

WASTE VOLUMES

See attached waste performance metrics, as applicable.

PROJECT SCHEDULE

See attached schedule.

BASELINE BY YEAR

See attached Baseline by Year Report.